

Titanium Matrix Composite Pressure Vessel, Phase I

Completed Technology Project (2007 - 2007)



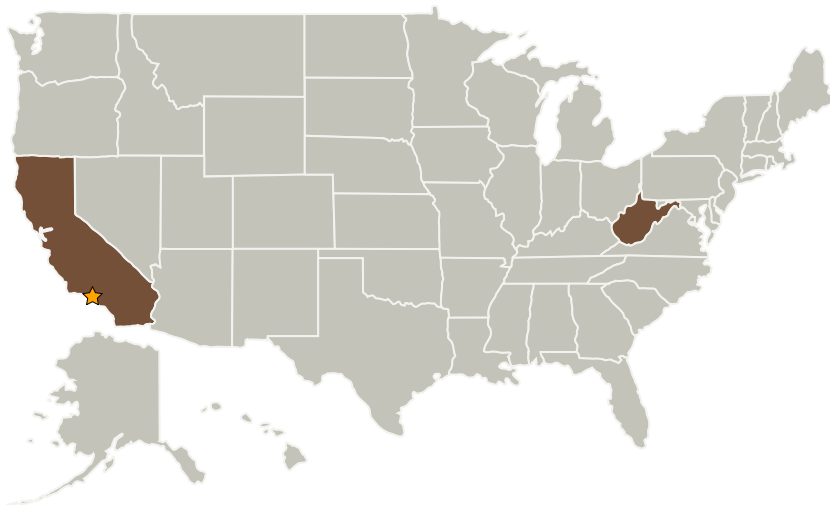
Project Introduction

For over 15 years, FMW Composite Systems has developed Metal Matrix Composite manufacturing methodologies for fabricating silicon-carbide-fiber-reinforced titanium components, also known as Titanium Matrix Composites (TMC), for the aerospace industry. These efforts have resulted in successfully flight qualifying three TMC components, including a piston rod used in the divergent exhaust nozzle actuator for the Pratt & Whitney F119 engine (F-22), and two exhaust nozzle actuator links for the GE F110 engine (F-16). TMC weight savings over the monolithic titanium and steel components being replaced typically varies from 35 to 45% depending upon the application load requirements. The relatively low density of TMC (10% lower than Titanium) combined with its excellent mechanical behavior, results in significantly higher specific static properties than conventional material systems. Additionally, creep resistance of TMC is dramatically enhanced over monolithic titanium due to the presence of the SiC fibers, which do not exhibit discernible creep at the temperature regime of interest. Currently, FMW is working closely with the aerospace industry to develop TMC structural components for both Military and Commercial airframe applications. FMW proposes to use this same technology to work with the Jet Propulsion Lab to develop a TMC pressure vessel for the Venus Lander mission.

Anticipated Benefits

Potential NASA Commercial Applications: See above.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
FMW Composite Systems, Inc.	Supporting Organization	Industry	Bridgeport, West Virginia

Primary U.S. Work Locations

California	West Virginia
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Project Transitions

**January 2007:** Project Start**July 2007:** Closed out**Closeout Summary:** Titanium Matrix Composite Pressure Vessel, Phase I Project Image

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Steve Spear

Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
 - └ TX12.4 Manufacturing
 - └ TX12.4.1 Manufacturing Processes